

PROJECT NUMBER: 6908
PROJECT TITLE: Smoke Condensate Studies
PROJECT LEADER: R. D. Kinser
PERIOD COVERED: July, 1988

I. ORIENTAL TOBACCO STUDIES

- A. Objective: To ascertain the existence of a chemical inhibitor to TSNA formation/pyrosynthesis in oriental tobacco.
- B. Results: Fillers were prepared by addition of burley (Bu), oriental (Ori) and mixed Bu and Ori CELs to Bu base web and were smoked to determine MS TSNA deliveries in a replicate of a previously reported experiment. MS NNN and NAT levels were again significantly reduced when Ori CEL was added to the Bu CEL.

Acid, base, and neutral fractions of Ori CEL were prepared for model studies of possible inhibition of TSNA formation by a component of Ori tobacco.

- C. Plans: Investigate the effect of Ori CEL fractions on the formation of TSNA in a model alkaloid/nitrite system.

D. References:

Haut, S. A. Notebook No. 8595, p. 114.
Warfield, A. H. Notebook No. 8558, p. 178.

II. TSNA DECOMPOSITION STUDIES

- A. Objective: To explore the thermal stability of TSNA and investigate methods to enhance thermally induced decompositions of these compounds.
- B. Results: Addition of ascorbyl palmitate (AP) to NNN followed by a slow heating regimen (5°C/min) shifted the temperature of onset of NNN decomposition from 220°C to 140°C and increased the extent of decomposition from 35% to 80%. No enhancement in NNN decomposition due to the addition of propyl dihydroxyhydrocinnamate was observed over the temperature range 200 - 350°C.

- C. Plans: Replicate the slow heating experiment with NNN and AP.

D. References:

Morgan, W. R. Notebook No. 8579, p. 47.
Tickle, M. H. Notebook No. 8587, p. 189.

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III. TSNA PRECURSORS

- A. Objective: To determine the precursors of MS TSNA.
- B. Results: Experiments to evaluate N-isobutenyl nicotinium citrate as a model of unextracted nicotine have been cancelled due to problems with synthesis of the compound.
- C. Plans: Investigate the use of microencapsulated nicotine bitartrate and a nicotine amino acid as alternate models for unextracted nicotine.
- D. References:

Haut, S. A. Notebook No. 8595, p. 114.

IV. TSNA IN PROJECT ART MATERIALS

- A. Objective: To determine the TSNA or alkaloid levels of fillers of lowered nicotine content or other materials generated in Project ART studies.
- B. Results: A method for alkaloid analysis by extraction with benzene/ chloroform in the presence of barium hydroxide followed by quantitation of alkaloids by hplc has been developed. This method is being used to examine samples generated by extraction of tobacco with supercritical fluids.
- C. Plans: Provide analyses of fillers and other materials associated with the extraction of tobacco by supercritical fluids as requested.
- D. References:

Lambert, E. A. Notebook No. 8523, p. 168.
Warfield, A. H. Notebook No. 8558, p. 178.

V. OPTIMIZATION OF A LOW ACTIVITY MODEL: MS NITRIC OXIDE CONTENT

- A. Objective: To develop methods of reducing MS NO delivery for a low activity model.
- B. Results: Method development for measurement of MS NO levels continued. An interference in the first hydrogen peroxide solution utilized was shown to be the source of the high NO value obtained originally for the test cigarettes. A new lot of hydrogen peroxide, however, yielded a measurement that was significantly lower than the CI value for these cigarettes. Evaluation of a nitrate standard solution by the standard addition procedure gave good results, but similar studies of the test cigarettes yielded ambiguous information.

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C. Plans: Examine different concentrations of hydrogen peroxide and oxidation conditions. Evaluate performance of chemiluminescent detection (thermal energy analyzer) for NO measurement.

D. References:

Levins, R. J. Notebook No. 8672, p. 14.

VI. SUPPORT FUNCTION: CONDENSATE PREPARATION

A. Objective: To fabricate cigarettes, perform smokings, and prepare condensate as needed for biological and chemical analysis.

B. Results: Thirty-five fillers were prepared by spraying bright base web with burley CEL, calcium acetate, and mixtures of Bu CEL and calcium acetate, and cigarettes were hand-fabricated from these fillers. Twenty smokings of five cigarette codes were performed to collect condensate for biological assay.

C. References:

Hellams, R. D. Notebook No. 8613, p. 94.

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